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PRELIMINARY SUMMARY OF INSECT CONDITIONS  
IN NORTHERN ROCKY MOUNTAINS  
1957

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*RA*  
PERMISS \_\_\_\_\_  
WHITESIDE *Jmw*  
BUCKHORN *WJB*  
WEAR *Jmw*  
CAROLIN *Jmw*  
WRIGHT *Jmw*  
COULTER *Jmw*  
ROSE \_\_\_\_\_  
ORR *Jmw*  
THOMAS \_\_\_\_\_  
WILLIAMS \_\_\_\_\_  
WATCHEL \_\_\_\_\_

SUMMARY

*RA*  
Preliminary summaries of aerial and ground detection and appraisal forest insect surveys made by the Missoula Forest Insect Laboratory and cooperators indicate the presence of epidemic infestations of several insect species and spider mites in the northern Rocky Mountain states. The most severe infestation in the region continues to be that of the spruce budworm. Since its appearance in about 1944 the infestation has steadily grown to cover a total of 5,030,000 acres of Douglas-fir timber type, most of which has been in Montana. Despite control programs between 1952 and 1957 which killed the budworm population on 2,184,000 acres of fir host type, there still remains uncontrolled a total of 2,846,000 acres of Douglas-fir host type in 1957. Other epidemic infestations include that of the black-headed budworm on about 32,000 acres of western hemlock in western Montana and northern Idaho, that of the larch budmoth on 250,000 scattered acres of high elevation western larch stands in western Montana and northern Idaho, and that of the larch casebearer on 5,000 acres of second growth western larch near St. Maries, Idaho. "Hot spot" centers of active Engelmann spruce beetle infestations continue to exist in scattered localities in western Montana and northern Idaho where logging has been conducted for beetle control purposes. Very severe infestations of the spruce mite cover 750,000 acres of Douglas-fir host type which were treated in 1956 by the aerial application of DDT for the control of the spruce budworm in Montana.

INTRODUCTION

The purpose of this report is to present preliminary findings of the 1957 aerial and ground forest insect surveys in northeastern Washington, northern Idaho, Montana, northwestern South Dakota and Yellowstone National Park, Wyoming. Additional information will be available shortly upon the completion of some of the survey data.

The surveys were conducted by the Missoula Forest Insect Laboratory with the assistance and cooperation of the regional office and national forest personnel of the U. S. Forest Service, and the forestry and field personnel of the National Park Service, Bureau of Indian Affairs, Soil Conservation Service, Bureau of Land Management, the offices of the several State Foresters and of the forest industries. The most serious insect infestations will be described in more detail in subsequent individual survey reports.

## BARK BEETLES

Western pine beetle.--Mortality of ponderosa pine caused by the western pine beetle, Dendroctonus brevicomis Lec., remains at a low endemic level throughout the region. Infested trees occur widely scattered, but very few, throughout the pine stands.

Mountain pine beetle in lodgepole pine.--Mountain pine beetle (Dendroctonus monticolae Hopk.) infestations appear to be at a low level throughout the region. Two infestations in lodgepole pine timber are reported active at this time. On privately-owned land near Soldiers Reservoir south of Lewiston, Idaho, an infestation which is believed to have developed in water-killed lodgepole pine stands several years ago is still highly epidemic. The infestation is confined to pole-type timber in the immediate vicinity of the reservoir but seems to have increased in area from year to year.

In Glacier National Park, Montana an infestation of epidemic proportions continues in a small area of mature lodgepole pine timber immediately north of Kintla Lake. This infestation has been under close observation for several years by both aerial and ground surveys. At the present there are approximately 1,600 infested trees on 300 acres (table 1).

Mountain pine beetle in western white pine.--Detection surveys in western white pine stands on the Clearwater National Forest indicate that the mountain pine beetle is active to a limited extent in the Orogrande drainage, the Cold Springs-Quartz Creek area, along the Clearwater River Canyon and in the Dead Horse area. Infestation was found to be killing 0.47 percent of the pine stems in 1957 compared to 0.18 percent in 1956. Otherwise, mountain pine beetle activity has not changed materially in these areas for several years. Surveys made in 1951 showed that the beetle killed from 0.7 to 1.3 percent of the stems in that year. In 1957, the heaviest damage found was along the Clearwater River Canyon north of Sheep Mountain where 1.03 percent of the stems in the residual stand was found to be infested. In mature western white pine stands such annual losses from the beetle may be considered normal. All areas are in Idaho.

Mountain pine beetle in ponderosa pine.--Only scattered, single mature trees have been killed by the beetle in ponderosa pine forests immediately west of the Continental Divide in Montana. The infestation is considered endemic.

Douglas-fir beetle.--Only one infestation of consequence was reported during 1957. Approximately 25 percent of the mature overstory trees on 1,000 acres in the Yellowstone River Canyon in Yellowstone National Park has been killed by the beetle during the past three years. The beetle-infested trees were previously heavily defoliated by the spruce budworm in 1953-55. The area was treated with a DDT aerial spray for budworm control in 1955. The beetle is Dendroctonus pseudotsugae (Hopk.).

Engelmann spruce beetle.--Remnants of the 1952-56 epidemic outbreak of the Engelmann spruce beetle, Dendroctonus engelmanni Hopk., remain alive in some stands of pure spruce where logging is being conducted for beetle control purposes. However, in most instances where the stands are composed of pure, mature spruce and where they have been logged for beetle control or killed outright by the beetle, the infestation has died out. Continued logging may be a factor in prolonging "hot spot" centers of active infestations by providing breeding places in the chunks, cull logs, and tops which are shaded by residual trees, and by preserving pure spruce host type highly susceptible to beetle attack. The course of the infestation in unlogged and logged areas is shown in table 2. The percentage of residual spruce stands currently infested is shown in table 3 from selected survey areas.

Ips engraver beetles.--Losses in ponderosa and western white pine stands from engraver beetles (Ips spp.) were insignificant in 1957.

#### DEFOLIATORS

Spruce budworm.--The 1957 aerial and ground detection and appraisal surveys showed a total of approximately 2,846,000 acres of Douglas-fir timber type infested by the spruce budworm (Choristoneura fumiferana (Clem.)). This does not include the 785,000 acres of host timber type sprayed with DDT during the year for budworm control. The total uncontrolled infested acreage remaining as of October 1957 represents an increase of about 100,000 acres of new infestation, most of which is on private lands. Approximately 90 percent of the infested acreage lies in Montana, the remainder being in the Craig Mountain area in northern Idaho. The acreage of the host type infested during the period 1953 to 1957 is shown in table 4. The budworm is currently causing severe tree damage and understory mortality on approximately 1,250,000 acres in Montana.

Black-headed budworm.--High endemic populations of the black-headed budworm (Acleris variana (Fern.)) are reported throughout many Douglas-fir stands in Montana in conjunction with epidemic spruce budworm populations. This situation is particularly noticeable east of the Continental Divide. Epidemic populations of the black-headed budworm caused severe defoliation in western hemlock stands in scattered locations in the Kootenai National Forest and in Glacier National Park, Montana, and on the Kaniksu National Forest in Idaho. Aerial surveys showed that these scattered infestations total approximately 32,000 acres in which the hemlock damage is highly visible (table 5). Ground surveys have also recorded active infestations in grand fir stands in the Pend Oreille River drainages in Newport, Washington. Damage, however, is not visible.

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Additional ground surveys in the budworm infested hemlock stands indicate that, although feeding was heavy in 1957, the budworm populations going into the winter are extremely light. In some cases there was a drastic reduction in larval population prior to pupation, probably due to insect disease. Additional surveys of this nature are being made.

Douglas-fir tussock moth.--No active infestations of the Douglas-fir tussock moth (Hemerocampa pseudotsugata McD.) were reported in the region in 1957.

Larch budmoth.--The present epidemic of the larch budmoth, Zeiraphera griseana (Hubner), was first observed in the Northern Rockies in 1955 in western larch stands. In the ensuing two-year period, the aggregate acreage of visible defoliation increased from about 33,000 to an estimated 250,000 acres comprised of scattered infestation centers. Ground examinations of foliage damage have been difficult because of the large size of the infested trees and the necessity of felling the trees for close observation. Observations of this nature in several localities indicate that the budmoth feeding has caused a reduction in the usable leaf surface of infested trees of at least 50 percent in 1957. Budmoth damage of this magnitude has not previously occurred in the region. Most of the current damage is located in mature larch stands in western Montana and northern Idaho.

Larch looper.--In 1957 the larch looper, Semiothisa sexmaculata (Pack.), was the most widespread defoliator of larch in the Northern Rockies, although there are no records of its presence in this region prior to 1955. It was found in every larch stand in Montana and Idaho where examinations were made, but always at lower elevations than the stands infested by the larch budmoth (see above). With few exceptions, looper populations were relatively small and the injury to the larch foliage was negligible except in a few heavily infested areas. Feeding damage became visible in September.

Larch sawflies.--During the past two years populations of the two-lined larch sawfly (Anoplonyx occidens Ross) and occasionally the western larch sawfly (A. laricivorus Roh. & Midd.) were observed in association with populations of the above larch looper throughout the range of western larch in Montana and northern Idaho. The amount of visible damage to the foliage as a result of their feeding appeared slight.

Larch casebearer.--The larch casebearer (Coleophora laricella (Hbn.)), a European insect widely present throughout the eastern United States, made its appearance in the region for the first time in 1957. An infestation of approximately 5,000 acres in second growth western larch stands near St. Maries, Idaho was reported during the year. This is the first recorded outbreak of this insect in the western United States. The extent of the infestation, together with the large size of the population, suggests that the insect may have been present in this area for several years prior to 1957. The feeding of the larvae produced severe defoliation on the infested trees and there are indications that additional defoliation will occur in the area in 1958. The epidemiology of and control methods for the insect under western forest conditions are not presently known.

## SUCKING INSECTS

Cooley gall louse.--High endemic infestations of the Cooley gall louse (Chermes cooleyi Gill.) were reported in Douglas-fir Christmas tree stands in the upper Kootenai River and Tobacco River Valleys in northwestern Montana. The infestations are associated with severe infections of the Douglas-fir needle blight, Rhabdocline pseudotsugae Syd.

Scale Insects.--Small localized infestations of the black pine leaf scale (Nuculaspis californica (Coleman)) and the pine leaf scale (Phenacaspis pinifoliae (Fitch)) are reported on ponderosa pine trees in the vicinity of Spokane, Washington. These infestations are remnants of epidemic infestations which were subdued in 1951 and 1955 by unseasonable freezing air temperatures. Current damage from both insect species is insignificant except on a few individual trees.

## SPIDER MITES

Spruce mite.--Very severe and widespread infestations of the spruce mite, Oligonychus ununguis (Jac.) appeared during 1957 in a majority of the Douglas-fir stands in Montana which were treated in 1956 for spruce budworm control. Aerial surveys mapped approximately 236,000 acres of mite damage on the Helena National Forest, 300,000 acres on the Lewis and Clark National Forest, and an estimated 214,000 acres on portions of the Beaverhead, Deerlodge, and Gallatin National Forests. Practically all of the 750,000 acres of mite damage are located within the 885,000 acres of fir type sprayed in 1956 with DDT for spruce budworm control. The mite damage consists of the desiccation of the fir needles causing severe yellowish discoloration. If these needles fall during the winter of 1957-58, the damage will be more than the defoliation by the budworm during the previous three or four years.

The mite infestation is believed to have been caused by the killing of predaceous mites and insects by the DDT in 1956 and by the long dry summer in 1957 which was favorable for the build-up of mite populations. The possibility of the continuation of present infestations and the appearance of new infestations in areas sprayed for budworm control in 1957 are not known at this time because of the lack of previous outbreak history. Present mite control methods developed for orchard and agricultural application are not applicable to forest infestations. DDT will not kill the spruce mite under normal dosages.

Table 1.--Progress of the mountain beetle infestation at Kintla Lake, Glacier National Park, Montana during the period 1954-1957

|  | 1954 | 1955 | 1956 | 1957 |
|--|------|------|------|------|
| Survey sample, no. of acres                    | 50   | 14   | 14   | 14   |
| " " , % of infested area                       | 16.6 | 4.6  | 4.6  | 4.6  |
| No. of infested trees <sup>1/</sup> , per acre | 2.2  | 4.4  | 2.1  | 5.2  |
| " " " " , total                                | 669  | 1320 | 621  | 1608 |

<sup>1/</sup> Lodgepole pine

Table 2.--Trend of the Engelmann spruce beetle infestation in the northern Rockies, by index number and board-foot spruce volume killed

|   | 1952 | 1953 | 1954 | 1955 | 1956 |
|---|------|------|------|------|------|
| Spruce volume killed on<br>nat'l forests, MM b.m. | 617  | 881  | 590  | 332  | 165  |
| Index of change;<br>unlogged areas                | 1.0  | 1.9  | 1.6  | 0.6  | 0.2  |
| logged for beetle control                         | 1.0  | 1.4  | 0.9  | 0.5  | 0.3  |



Table 3.--Average percentage of residual spruce stands killed in 1957  
by the Engelmann spruce beetle in selected drainages of the  
Kootenai National Forest, Montana

| Drainage      | Engelmann spruce trees sampled |        |       | % of trees<br>killed |
|---------------|--------------------------------|--------|-------|----------------------|
|               | Number of trees                |        |       |                      |
|               | Green                          | Killed | Total |                      |
| Caribou Creek | 434                            | 33     | 472   | 3.0                  |
| Pinkham Creek | 7,570                          | 550    | 9,120 | 6.0                  |
| Yaak River    | 5,618                          | 79     | 5,697 | 1.4                  |

Table 4.--Estimated annual acreage of spruce budworm-infested Douglas- and true fir forests in the northern Rocky Mountain States

| Year               | Status of infestation               | Acreage   |
|--------------------|-------------------------------------|-----------|
| 1953 <sup>1/</sup> | Uncontrolled, as of October         | 2,100,000 |
| 1954 <sup>1/</sup> | Controlled by aerial spraying, July | none      |
|                    | New, September                      | 84,000    |
|                    | Net uncontrolled, October           | 2,184,000 |
| 1955 <sup>1/</sup> | Controlled by aerial spraying, July | 368,000   |
|                    | New, September                      | 1,284,000 |
|                    | Net uncontrolled, October           | 3,100,000 |
| 1956               | Controlled by aerial spraying, July | 885,000   |
|                    | New, September                      | 1,316,000 |
|                    | Net uncontrolled, October           | 3,531,000 |
| 1957               | Controlled by aerial spraying, July | 785,000   |
|                    | New, September (estimated)          | 100,000   |
|                    | Net uncontrolled, October           | 2,846,000 |

<sup>1/</sup> Lighter survey intensities used these years; infested acreages were probably larger than shown.

Table 5.--Acreage of visible western hemlock defoliation caused by the black-headed budworm in 1957

| <u>Location</u>                   | <u>Acreage</u> |
|-----------------------------------|----------------|
| Kaniksu National Forest, Idaho    | 21,560         |
| Kootenai National Forest, Montana | 9,970          |
| Glacier National Park, Montana    | <u>470</u>     |
| TOTAL                             | 32,000         |